

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY) 2. REPORT TYPE
Technical Paper 3. DATES COVERED (From - To)

4. TITLE AND SUBTITLE 5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S) 5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) 8. PERFORMING ORGANIZATION
REPORT

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) 10. SPONSOR/MONITOR'S
ACRONYM(S)

11. SPONSOR/MONITOR'S
NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:

17. LIMITATION
OF ABSTRACT

18. NUMBER
OF PAGES

19a. NAME OF RESPONSIBLE
PERSON

19b. TELEPHONE NUMBER
(include area code)

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

20030205 285

MEMORANDUM FOR PR (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO)

04 Dec 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2000-230**
 Wassom, S.R. (Thiokol); Farmer, G.D. (SRS); Holmes, Michael R, "Solar Thermal Propulsion IHPRPT
 Demonstration Program Results"

37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference (Statement A)
(Salt Lake City, UT, 8-11 Jul 2001) (Deadline for Abstract: 08 Nov 00 - Extended)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.

Comments: _____

Signature _____ Date _____

2. This request has been reviewed by the Public Affairs Office for: a.) appropriateness for public release and/or b) possible higher headquarters review.

Comments: _____

Signature _____ Date _____

3. This request has been reviewed by the STINFO for: a.) changes if approved as amended, b.) appropriateness of references, if applicable, and c.) format and completion of meeting clearance form if required

Comments: _____

Signature _____ Date _____

4. This request has been reviewed by PR for: a.) technical accuracy, b.) appropriateness for audience, c.) appropriateness of distribution statement, d.) technical sensitivity and economic sensitivity, e.) military/national critical technology, and f.) data rights and patentability

Comments: _____

APPROVED/APPROVED AS AMENDED/DISAPPROVED

 PHILIP A. KESSEL Date
 Technical Advisor
 Propulsion Science and Advanced Concepts Division

Solar Thermal Propulsion IHPRPT Demonstration Program Results

Steven R. Wassom, Dean M. Lester
Thiokol Propulsion
Brigham City, UT

Gregory D. Farmer
SRS Technologies
500 Discovery Drive
Huntsville, AL

Michael R. Holmes
Air Force Research Laboratory
Edwards AFB, CA

Abstract

Spacecraft powered by solar thermal propulsion engines will be able to provide the velocity change required to economically maneuver large payloads from one orbit to another or to perform interplanetary missions. This innovative concept, when applied, will double the efficiency of currently used LH₂ - LO₂ chemical upper stages. Solar thermal propulsion uses the sun's energy to heat a low molecular weight working fluid such as hydrogen to very high temperatures (3,000K). The stored thermal energy is then converted to kinetic energy as the working fluid exits a diverging nozzle.

Under Integrated High Payoff Rocket Propulsion Technology (IHPRPT) funding, the Air Force Research Lab (AFRL) has sponsored the team of Thiokol Propulsion and SRS Technologies to demonstrate the technological readiness and performance of an inflatable solar thermal propulsion system. This paper will address the results of this program, which includes the fabrication and thermal vacuum testing of a 4 X 6 meter inflatable flight quality solar concentrator. The program culminates in a full-up integrated proof-of-concept ground test of a direct gain solar thermal propulsion system. The results of this test will be reported. These tests will demonstrate that the technology is ready for development of flight hardware for Solar Orbital Transfer Vehicles.

DISTRIBUTION STATEMENT A

Approved for Public Release
Distribution Unlimited